Original Article

"Assess The Effect Of Glycerin Application Versus Chlorhexidine Mouth Wash On Oral Mucositis Among Children With Cancer Receiving Chemotherapy."

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Abstract

Globally, each year nearly 400,000 children and adolescents, who is at the age of 0 to19 years, old develop cancer. Most common type of cancer found among the children is leukaemia's, brain cancers, lymphomas and solid tumours, such as neuroblastoma and Wilms tumour's. **The objective of study**: assess the grade of the oral mucositis among children with cancer receiving chemotherapy, evaluate effect of glycerin application on oral mucositis among experimental group I, to evaluate effect of chlorhexidine on oral mucositis among experimental group II, To compare the effect of glycerine application and chlorhexidine on oral mucositis, To find association of oral mucositis with selected demographic variables. **Material and Methods:** In present study, researcher adopted Quantitative Approach with True experimental design. It was carried out on 60 samples Effectiveness of glycerine application versus chlorhexidine mouth wash on oral mucositis among children with cancer receiving chemotherapy. Data analysis was done using descriptive statistics and inferential statistics. **Result** Major findings of the study stated that**,** Experimental Group I on day1 first observation, 57% of the children with cancer receiving chemotherapy had Grade I oral mucositis, 40% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis.In Experimental Group II on day1 of first observation, 47% of the children with cancer receiving chemotherapy had Grade I oral mucositis, 33% of them had Grade II oral mucositis and 20% of them had Grade III oral mucositis. That is shows that information booklet was effective method to increase knowledge. Conclusion The study concluded that this study is saying that both the glycerin and chlorhexidine treatment is effective for the treatment of chemotherapy-induced oral mucositis for all grades.

Keywords Assess, effectiveness, mucositis, glycerine, and chemotherapy

Introduction

Globally, each year nearly 400 000 children and adolescents who at the age of 0 to19 years old develop cancer. Most common type of cancer found among the children is leukemias, brain cancers, lymphomas and solid tumours, such as neuroblastoma and Wilms tumors. Developed countries have effective facilities for cancer management and care among those countries more than 80% of children with cancer are cured. In low- and middle-income countries (LMICs), less than 30% are cured.[1,2] Many children are required to get chemotherapy for treatment of cancer. There are many complications caused by chemotherapy Mucositis is the most common oral complication of cancer therapy. Oral mucositis in childhood is more frequent and severe compared to adults, especially in children with leukemia. Lesions develop as the chemotherapeutic agents attack the rapidly dividing cells of the oral mucous membrane.[6]

A research study conducted by Amanda F. Gabriel, et.all, on Incidence and risk factors for oral mucositis in pediatric patients receiving chemotherapy.The result shows that age ranged from 0 to 17 years (mean/SD, 8.58 ± 5.05) and fifty-one patients (45.54%) were females. The most common baseline diseases were leukemia (51%) followed by sarcomas (23%) and lymphomas (18%). Eight hundred and twenty-nine cycles of chemotherapy were evaluated, and OM was diagnosed in 527 cycles (63.57%). Chemotherapy protocols using MTX-HD, MTX-HD associated with doxorubicin and cyclophosphamide, and MTX-HD and cyclophosphamide a have higher incidence of severe grades of OM.[7] Cancer, as a malignant neoplasm, is a broad group of various diseases, all involving unregulated cell growth. In cancer, cells divide and grow uncontrollably, forming malignant tumors, and invade nearby parts of the body. Over the past 47 years, there have been dramatic changes in the treatment of children with cancer malignancies. Mortality rates for childhood cancer have declined by 50% since 1975. The substantial progress in pediatric cancer survival rates is attributable largely to improved treatments and the high proportion of patients participating in clinical trials.[4]

Need of the study

In India,almost 1.6 to 4.8% of all cancer in India is seen in children below 15 years of age; and the overall incidence of 38 to 124 per million children, per year, is lower than that in the developedworld.[15] Each year the American Cancer Society estimates the numbers of new cancer cases and deaths that will occur in the United States in the current year and compiles the most recent data on cancer incidence, mortality, and survival. Incidence data were collected by the National Cancer Institute(Surveillance, Epidemiology, and End Results [SEER] Program), the Centers for Disease Control and Prevention (National Program of Cancer Registries), and the North American Association of Central Cancer Registries. Mortality data were collected by the National Center for Health Statistics. A total of 1,658,370 new cancer cases and 589,430 cancer deaths are projected to occur in the United States in 2015.

During the most recent 5 years for which there are data (2007-2011), delay-adjusted cancer incidence rates (13 oldest SEER registries) declined by 1.8% per year in men and were stable in women, while cancer death rates nationwide decreased by 1.8% per year in men and by 1.4% per year in women. The overall cancer death rate decreased from 215.1 (per 100,000 population) in 1991 to 168.7 in 2011, a total relative decline of 22%. However, the magnitude of the decline varied by state, and was generally lowest in the South (15%) and highest in the Northeast (20%). For example, there were declines of 25% to 30% in Maryland, New Jersey, Massachusetts, New York, and Delaware, which collectively averted 29,000 cancer deaths in 2011 as a result of this progress. Further gains can be accelerated by applying existing cancer control knowledge across all segments of the population.[5]

Aim of the Study

The aim of the study was to find out effect of glycerin application versus chlorhexidine mouth wash on oral mucositis among children with cancer receiving chemotherapy.

Research Methodoly

In present study, researcher adopted Evaluative research with Pretest posttest research design. Objectives of the study: . To assess the grade of the oral mucositis among children with cancer receiving chemotherapy. To evaluate effect of glycerin application on oral mucositis among experimental group I. To evaluate effect of chlorhexidine on oral mucositis among experimental group II. To compare the effect of glycerin application and chlorhexidine on oral mucositis.To find association of oral mucositis with selected demographic variables. It was carried out on 60 samples Effectiveness of glycerine application versus chlorhexidine mouth wash on oral mucositis among children with cancer receiving chemotherapy. Demographic data, WHO grading system for oral mucositis, profile for glycerine & chlorohexidine. Data analysis was done using descriptive statistics and inferential statistics. Researchers use inter-rater method to assess the quality of a study, and one of the most important criteria, among that is reliability, which refers to the accuracy and consistency of information obtained in a study. Tool is said to be reliable if the co-efficient is more than 0.745.

A pilot study was conducted from 1st March 2022 to 20th March 2022 to assess the feasibility of the study,before deciding the plan for data analysis. Prior administrative permission was obtained from the Indryani Hospital and Cancer Institute, Pune.

Results

The data was arranged in six section:

Section I

Description of the adults according to their demographic characteristic

Data presented shows percentage wise distribution experimental group I, 36.7% of the children with cancer receiving chemotherapy had age 2 to 5 years, 43.3% of them had age 6 to 9 years, 10.0% of them had age 10 to13 years and 10.0% of them had aged 14 to17 years. In Experimental group II, 33.3% of the children with cancer receiving chemotherapy had age 2 to 5 years, 46.7% of them had age 6 to 9 years, 13.3% of them had age 10 to13 years and 6.7% of them had age 14 to17 years.In experimental group I, 43.3% of them were males and 56.7% of them were females. In experimental group II, 36.7% of them were males and 63.3% of them were females.In, an experimental group I,33.3% of them had a family income of Rs20,000/- to 30,000/- and 66.7% of them had a family income above Rs 30,000/-. In experimental group II, 36.7% of them had family income Rs20,000/- to 30,000/- and 63.3% of them had family income above Rs30,000/-.

Experimental Group I, 26.7% of the children with cancer receiving chemotherapy had weight 5 to10 kg, 23.3% of them had weight 11 to 20 kg, 33.3% of them had weight 21 to30 kg and 16.7% of them had weight above 30 kg.In Experimental Group II 26.7% of the children with cancer receiving chemotherapy had weight 5 to10 kg, 23.3% of them had weight 11 to 20 kg, 33.3% of them had weight 21 to 30 kg and 16.7% of them had a weight above 30 kg. In Experimental Group I, 50% of them had a height 80 to110 cm, 33.3% of them had height 110 to140 cm, 10% of them had a height 140 to170 cm and 6.7% of them a had height more than 170 cm.In Experimental Group I, 50% of them had height 80 to110 cm, 33.3% of them had height 110 to140 cm, 10% of them had height 140 to170 cm and 6.7% of them had height more than 170 cm.In Experimental Group II,50% of them had height 80 to110 cm, 36.7% of them had height 110 to140 cm and 13.3% of them had height 140 to170 cm. In Experimental Group I, 33.3% of them had present hospitalization for less than 3 days, 40% of them had present hospitalization for 4 to 6 days and 26.7% of them had present hospitalization for 7 to9 daysIn Experimental Group II, 36.7% of them had present hospitalization for less than 3 days, 46.7% of them had present hospitalization for 4 to 6 days and 16.7% of them had present hospitalization stay for 7 to 9 days.In Experimental Group I,50% of them had 1 to 3 chemotherapy cycles, 40% of them had 4-6 chemotherapy cycles and 10% of them had 7 to 9 chemotherapy cycles.In Experimental Group II, 33.3% of them had 1 to 3 chemotherapy cycles, 46.7% of them had 4-6 chemotherapy cycles and 20% of them had 7 to 9 chemotherapy cycles. In Experimental Group I,56.7% of them had oral mucositis for less than 24 hours, 26.7% of them had oral mucositis for 24 to 48 hours, 13.3% of them had oral mucositis for 48 to72 hours and 3.3% of them had oral mucositis for more than 72 hours. In Experimental Group II,26.7% of them had oral mucositis for less than 24 hours, 23.3% of them had oral mucositis for 24 to48 hours, 30% of them had oral mucositis for 48 to72 hours and 20% of them had oral mucositis for more than 72 hours.

SECTION II

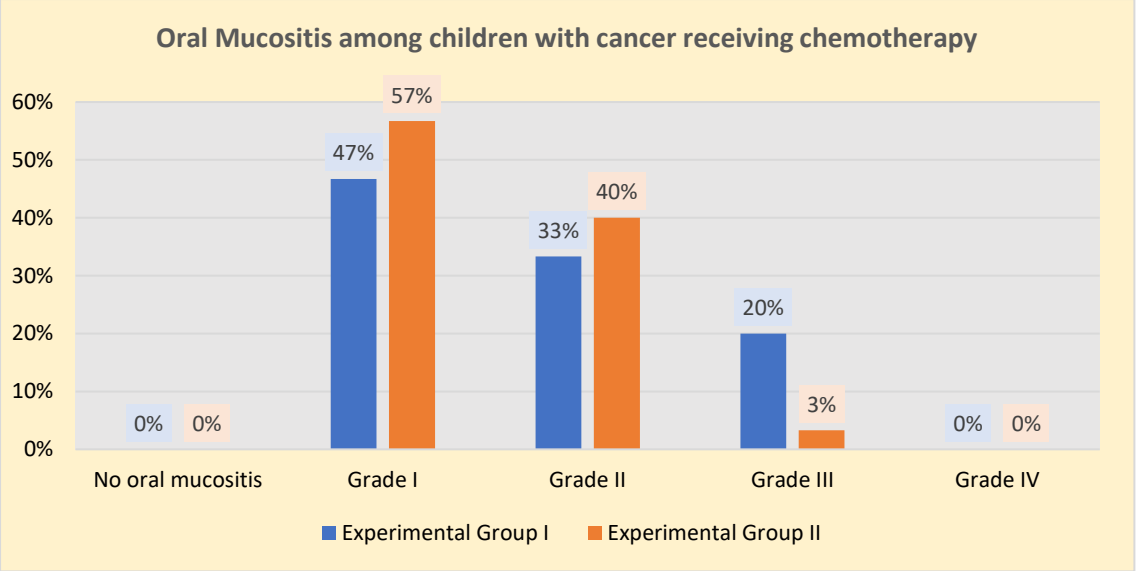

Figure No 1. Oral Mucositis among children with cancer receiving chemotherapy

Above figure number 2 shows that Experimental Group I on day1 first observation, 57% of the children with cancer receiving chemotherapy had Grade I oral mucositis, 40% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis.

In Experimental Group II, on day1 first observation, 47% of the children with cancer receiving chemotherapy had Grade I oral mucositis, 33% of them had Grade II oral mucositis and 20% of them had Grade III oral mucositis.

SECTION III

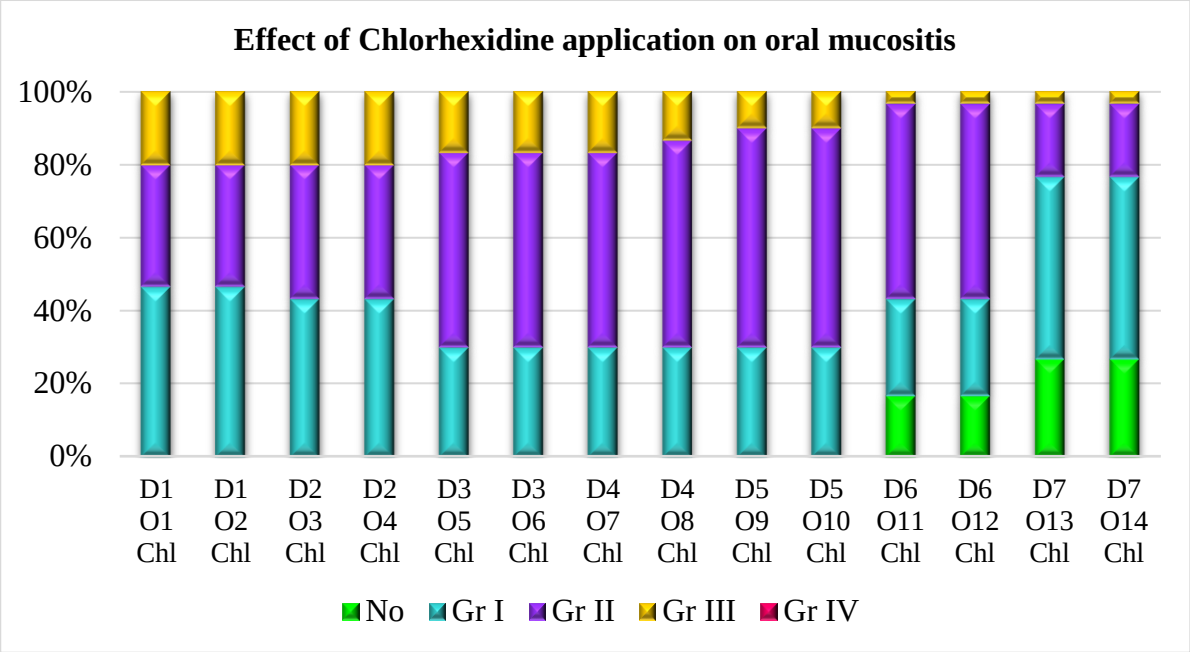

Figure No 2. Bar diagram of the children's as per oral chlorhexidine mouthwash used.

In Experimental Group II, on day1 first observation, 46.7% of the children with cancer receiving chemotherapy had Grade I oral mucositis, 33.3% of them had Grade II oral mucositis and 20% of them had Grade III oral mucositis. On day1 second observation, 46.7% of them had Grade I oral mucositis, 33.3% of them had Grade II oral mucositis and 20% of them had Grade III oral mucositis. On day2 third observation, 43.3% of them had Grade I oral mucositis, 36.7% of them had Grade II oral mucositis and 20% of them had Grade III oral mucositis. On day2 fourth observation, 43.3% of them had Grade I oral mucositis, 36.7% of them had Grade II oral mucositis and 20% of them had Grade III oral mucositis. On day3 fifth observation, 30% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 16.7% of them had Grade III oral mucositis. On day3 sixth observation, 30% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 16.7% of them had Grade III oral mucositis. On day4 seventh observation, 30% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 16.7% of them had Grade III oral mucositis. On day4 eighth observation, 30% of them had Grade I oral mucositis, 56.7% of them had Grade II oral mucositis and 13.3% of them had Grade III oral mucositis. On day5 ninth observation, 30% of them had Grade I oral mucositis, 60% of them had Grade II oral mucositis and 10% of them had Grade III oral mucositis. On day5 tenth observation, 30% of them had Grade I oral mucositis, 60% of them had Grade II oral mucositis and 10% of them had Grade III oral mucositis. On day6 eleventh observation, 16.7% of them did not have oral mucositis, 26.7% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day6 twelfth observation, 16.7% of them did not have oral mucositis, 26.7% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day7 thirteenth observation, 26.7% of them did not have oral mucositis, 50% of them had Grade I oral mucositis, 20% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day7 fourteenth observation, 26.7% of them did not have oral mucositis, 50% of them had Grade I oral mucositis, 20% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. This indicates that the oral mucositis among children with cancer receiving chemotherapy improved remarkably after Chlorhexidine application.

SECTION IV

Day	**Observation**	**Mucositis**	**Glycerin**	
			Freq	**%**
DAY 1	O1	No oral mucositis	0	0.0%
		Grade I	17	56.7%

		Grade II	12	40.0%
		Grade III	1	3.3%
		Grade IV	0	0.0%
	O2	No oral mucositis	0	0.0%
		Grade I	17	56.7%
		Grade II	12	40.0%
		Grade III	1	3.3%
		Grade IV	0	0.0%
DAY 2	O3	No oral mucositis	0	0.0%
		Grade I	16	53.3%
		Grade II	13	43.3%
		Grade III	1	3.3%
		Grade IV	0	0.0%
	O4	No oral mucositis	0	0.0%
		Grade I	16	53.3%
		Grade II	13	43.3%
		Grade III	1	3.3%
		Grade IV	0	0.0%
DAY 3	O5	No oral mucositis	0	0.0%
		Grade I	13	43.3%
		Grade II	16	53.3%
		Grade III	1	3.3%
		Grade IV	0	0.0%
	O6	No oral mucositis	0	0.0%
		Grade I	13	43.3%
		Grade II	16	53.3%
		Grade III	1	3.3%
		Grade IV	0	0.0%
DAY 4	O7	No oral mucositis	0	0.0%
		Grade I	8	26.7%
		Grade II	20	66.7%
		Grade III	2	6.7%
		Grade IV	0	0.0%
	O8	No oral mucositis	0	0.0%
		Grade I	8	26.7%
		Grade II	20	66.7%
		Grade III	2	6.7%
		Grade IV	0	0.0%
DAY 5	O9	No oral mucositis	0	0.0%
		Grade I	8	26.7%
		Grade II	19	63.3%
		Grade III	3	10.0%

		Grade IV	0	0.0%
	O10	No oral mucositis	0	0.0%
		Grade I	8	26.7%
		Grade II	19	63.3%
		Grade III	3	10.0%
		Grade IV	0	0.0%
DAY6	O11	No oral mucositis	0	0.0%
		Grade I	9	30.0%
		Grade II	17	56.7%
		Grade III	4	13.3%
		Grade IV	0	0.0%
	O12	No oral mucositis	0	0.0%
		Grade I	9	30.0%
		Grade II	17	56.7%
		Grade III	4	13.3%
		Grade IV	0	0.0%

Day	**Observation**	**Mucositis**	**Glycerin**	
			Freq	**%**
DAY 7	O13	No oral mucositis	3	10.0%
		Grade I	13	43.3%
		Grade II	10	33.3%
		Grade III	4	13.3%
		Grade IV	0	0.0%
	O14	No oral mucositis	3	10.0%
		Grade I	13	43.3%
		Grade II	10	33.3%
		Grade III	4	13.3%
		Grade IV	0	0.0%

Table no 1shows that in Experimental Group I on day1 first observation, 56.7% of the children with cancer receiving chemotherapy had Grade I oral mucositis, 40% of them had Grade II oral mucositis, and 3.3% of them had Grade III oral mucositis. On day1 second observation, 56.7% of them had Grade I oral mucositis, 40% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day2 third observation, 53.3% of them had Grade I oral mucositis, 43.3% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day2 fourth observation, 53.3% of them had Grade I oral mucositis, 43.3% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day3 fifth observation, 43.3% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day3 sixth observation, 43.3% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 3.3% of them had Grade III oral mucositis. On day4 seventh observation, 30% of them had Grade I oral mucositis, 53.3% of them had Grade II oral mucositis and 16.7% of them had Grade III oral mucositis. On day4 eighth observation, 26.7% of them had Grade I oral mucositis, 66.7% of them had Grade II oral mucositis and 6.7% of them had Grade III oral mucositis. On day5 nineth observation, 26.7% of them had Grade I oral mucositis, 63.3% of them had Grade II oral mucositis and 10% of them had Grade III oral mucositis. On day5 tenth observation, 26.7% of them had Grade I oral mucositis, 63.3% of them had Grade II oral mucositis and 10% of them had Grade III oral mucositis. On day6 eleventh observation, 30% of them had Grade I oral mucositis, 56.7% of them had Grade II oral mucositis and 13.3% of them had Grade III oral mucositis. On day6 twelfth

observation, 30% of them had Grade I oral mucositis, 56.7% of them had Grade II oral mucositis and 13.3% of them had Grade III oral mucositis. On day7 thirteenth observation, 10% of them did not have oral mucositis, 43.3% of them had Grade I oral mucositis, 33.3% of them had Grade II oral mucositis and 13.3% of them had Grade III oral mucositis. On day7 fourteenth observation, 10% of them did not have oral mucositis, 43.3% of them had Grade I oral mucositis, 33.3% of them had Grade II oral mucositis and 13.3% of them had Grade III oral mucositis. This indicates that the oral mucositis among children with cancer receiving chemotherapy improved remarkably after Glycerin application.

Section V

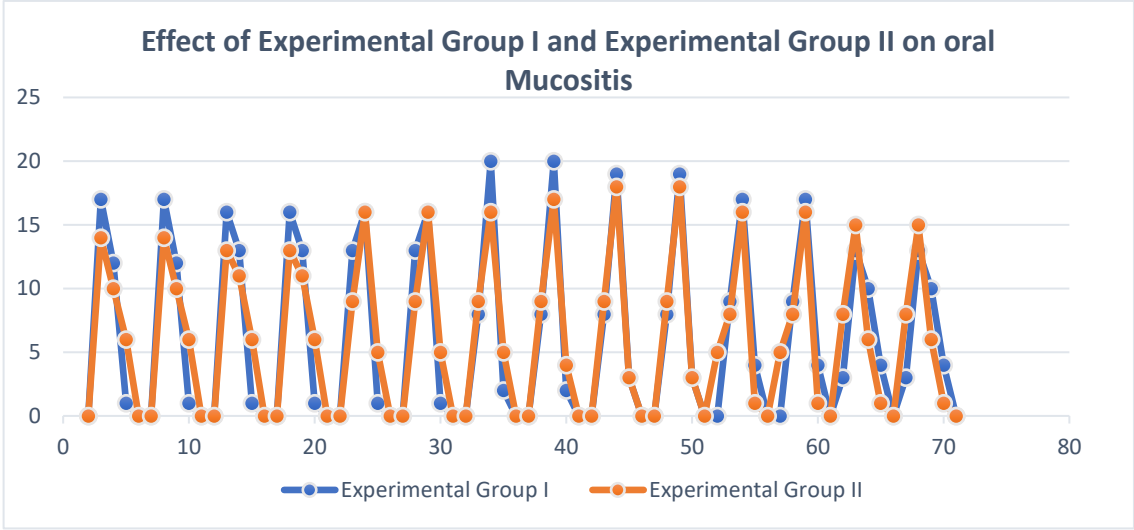

Figure No 4 Line diagram of the children as per Experimental Group I and II

Above Table No. 4 shows that the Experimental Group I on day1Second observation, the prevalence of Oral mucositis is M=7.5 and Sd = 8.34 and the Glycerin application used M= 7.96 and SD is 7.96 sign p-value is 0.163.

In Experimental Group II, on day of the first observative on, the prevalence of Oral mucositis is M=06 and Sd is 6.61 for the Glycine application used M= 7.96, and SD is 7.96 p-value is 0.163.

In Experimental Group I on the day2, third observation, the prevalence of Oral mucositis is M=6 and Sd = 6.04 and the Glycerin application used M= 6 and SD is 7.84 sign a p-value is 0.166. same observation of the fourth observation day as the third observation.

Day3 equals observation for the fifth and sixth observations, In Experimental Group II prevalence of Oral mucositis is M=6 and Sd = 7.7433,and the Glycerin application used M= 6 and SD is 7.84 sign a p-value is 0.186.

SECTION VI

Demographic variable		**Oral Mucositis WHO grading**			**p-value**
		Grade I	**Grade II**	**Grade III**	
Age	2 to5 years	11	7	3	0.473
	6 to 9 years	14	12	1	
	10 to 13 years	3	2	2	
	14 to17 years	3	1	1	
Gender	Male	15	6	3	0.315
	Female	16	16	4	
Family income	Rs 20000/- to 30000/-	14	6	1	0.231
	Above Rs 30000/-	17	16	6	

Since all the p-values are small (more than 0.05), Hence its Predicated that demographic variables were found to not having any significant association with the Oral Mucositis in children with cancer receiving chemotherapy.

Discussion

F. Denise Hungler, (2018), A study to assess the effectiveness, Oral mucositis is one of the most common adverse effects of chemotherapy and radiotherapy. Total 50 participant were selected Randomly for the study for three treatments, consisting of sodium bicarbonate 5% aqueous solution together with an additional dose of sodium bicarbonate 5% aqueous solution, chlorhexidine 0.12 %. The independent variable was treatment group, and confounders included socio demographic data, neutrophil count, chemotherapy for 50 participants. 68%(n=34) achieved grade 0 mucositis (none), with those using the double sodium bicarbonate rinse healing in five days on average95% for seven days and for the chlorhexidine group seven days95%for the Plantago major group. The pain experienced by the participants lessened over the 14 days of treatment, but differences in pain intensity between the three groups did not show statistical significance(p=0.762). Healing time was shorter with the double sodium bicarbonate solution compared to the other two rinses, but the differences were not significant. Our results suggest it may be time to reconsider the use of Plantago major extract in the management of oral mucositis.[5]

Another study conducted by Apitherapy News(2018),Study was to evaluate the effect of pure natural **glycerin** on radiation induced mucositis. In this randomized single blind(examiner blind)clinical trial 40 patients with head and neck cancer requiring radiation to the or pharyngeal mucosa were randomly assigned to two groups. Twenty patients received glycerin–while both the study and control groups received standard head and neck radiation therapy based on a standard protocol. In the study group patients were instructed to take 20 ml of honey 15 minutes before radiation therapy, then again at the interval of 15 minutes and six hours after radiation. In control group patients were instructed to rinse with 20 ml of saline before and after radiation. Patients were evaluated weekly for progression of mucositis using the oral mucositis assessing scale(OMAS).Result showed a significant reduction in mucositis among honey applied patients compared with control(p=o.ooo).As a conclusion within the limits of this study the results showed the application of natural honey is effective in managing radiation induced mucositis.[19]

Based on the above study reviewed present study is conducted.

Conclusion

The majority 20% developed Grade III Oral Mucositis on D1, D2, and D3. In Chlorhexidine group Garde I on Mucositis developed on the day (D)7 majority 50%. This study states that both the Glycerin and chlorhexidine treatment is effective for the treatment of chemotherapy-induced oral mucositis for all grades. Grade III majority of them developed on days 5,6& 7 at (13%) respectively. Grade II majority 66%. Grade II majority 53%. No one at grade IV was found. The number of chemotherapy cycles shows that there was an association with the duration of oral mucositis and the number of chemotherapy cycles taken by the children, as calculated p-value was 0.000 which was less than 0.05.Hence, here null hypothesis was rejected in the present study.At At the end of the study,the researcher concludes the general findings of the study.This study shows the magnitude of the refractive errors:In the Glycerin group Mucositis developed with Grade I by the third day after initiation of chemotherapy 56%, or O3, and O4 53%, D5,and D6 (O5 and O6) 43% respectively.

Conflict of interest

The authors certify that they have no involvement in any entity with any financial/ non-financial interest in the subject matter or materials discussed in this paper.

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